

भारतीय मानक

जलकल के लिए स्विंग चेक प्रकार के
रिफ्लक्स (गैरवापसी वाले) वाल्व — विशिष्टि

भाग 2 बहु-दरवाजे प्रतिरूप

(पहला पुनरीक्षण)

Indian Standard

SWING CHECK TYPE REFLUX (NON-RETURN)
VALVES FOR WATER WORKS PURPOSE —
SPECIFICATION

PART 2 MULTI-DOOR PATTERN

(*First Revision*)

ICS 91.140.70

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BUREAU OF INDIAN STANDARDS
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FOREWORD

This Indian Standard (Part 2) (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Sanitary Appliances and Water Fittings Sectional Committee had been approved by the Civil Engineering Division Council.

This standard was first published in 1986. In this revision following major modifications have been made:

- a) Minimum nominal size of valve has been kept as 500 mm as smaller size valves are not being manufactured in multi-door pattern.
- b) Minimum number of suspension lugs and doors have been specified.
- c) Requirements of mass of valves have been deleted in accordance with IS 5312 (Part 1) : 2004 'Specification for swing check type reflux (non-return) valves for water works purpose: Part 1 Single-door pattern' and IS 14846 : 2000 'Sluice valves for water works purposes (50 to 1 200 mm size) — Specification'.
- d) Other changes keeping in view the current manufacturing practices in the country have been made.

These are essentially non-return valves permitting water to flow in one direction only and check return flow. The operation is dependent on velocity of flow and weight of door suitably disposed, having no external means of control. In large diameter pipes (above 600 mm), the door in single-door pattern, takes longer to close thereby getting caught in return flow, causing slam. Therefore, multi-door pattern is resorted to for large sizes. Some times a smaller size may also call for a multi-door design particularly in systems where propensity for a door to slam is high.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

SWING CHECK TYPE REFLUX (NON-RETURN) VALVES FOR WATER WORKS PURPOSE — SPECIFICATION

PART 2 MULTI-DOOR PATTERN*(First Revision)***1 SCOPE**

This standard (Part 2) covers requirements for flanged reflux (non-return) valves of multi-door, swing check type used for water works purpose of sizes 500 to 1 200 mm.

2 REFERENCES

The standards listed in Annex A contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed in Annex A.

3 CLASS OF VALVE

Class of reflux valves shall be designated by nominal pressure (PN), defined as the maximum permissible gauge working pressure in MPa as PN 0.6 and PN 1.0.

4 NOMINAL SIZES

4.1 The valves shall be of the following nominal sizes: 500, 600, 700, 750, 800, 900, 1 000, 1 100 and 1 200 mm.

4.1.1 The nominal size shall refer to the nominal bore of the water way.

4.2 Typical illustration of swing check type reflux valve is given in Fig. 1.

5 MATERIALS

The materials used for the manufacture of different component parts of valves shall conform to the requirements given in Table 1. Where alternative materials are specified in Table 1, these may be used with the approval of the purchaser.

6 BODY ENDS**6.1 Flanged Body Ends**

Unless otherwise specified in the contract or order dimensions shall comply with the requirements of IS 1538.

Table 1 Materials for Different Component Parts of Reflux Valves
(Clause 5)

Sl No.	Component	Basic Materials			Alternative Materials		
		Material	Ref to IS	Grade or Designation	Material	Ref to IS	Grade or Designation
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	Body with hinge, door and diaphragm	Grey cast iron	IS 210	FG 260	a) Spheroidal or nodular iron	IS 1865	500/7 or 400/12
ii)	Hinge pin	Stainless Steel	IS 6603	12 Cr 12	b) Cast steel	IS 1030	230-450 W
					a) Stainless steel	IS 6603	04 Cr 17 Ni 12 Mo 2 or 04 Cr 19 Ni 9 or 15 Cr 16 Ni 2 HT2
iii)	Bolts	Carbon steel	IS 1363 (Part 1)	Class 4.6	b) High tensile brass	IS 320	—
iv)	Nuts, nuts for hinge pins	Carbon steel	IS 1363 (Part 3)	Class 4.0	—	—	—
v)	Bearing bushes	Leaded tin bronze	IS 318	LTB-2	PTFE/Reinforced PTFE	—	—
vi)	Face and seat rings	Leaded tin bronze	IS 318	LTB-2	a) Leaded tin bronze with 2 percent nickel	—	—
					b) Stainless steel	IS 6603	04Cr19 Ni.9
vii)	Flange jointing material	Rubber	IS 638	—	—	—	—

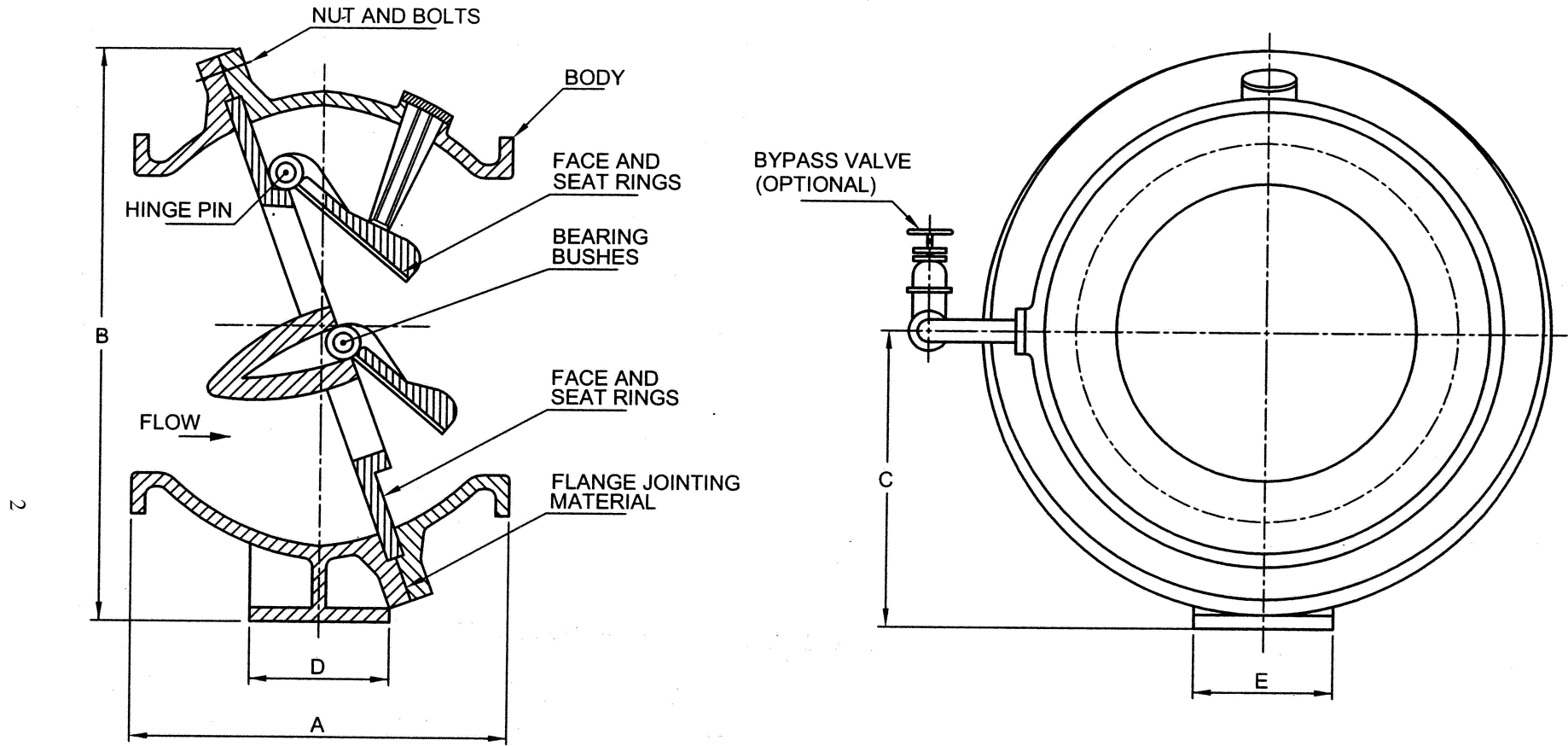


FIG. 1 TYPICAL MULTI-DOOR CHECK VALVE

6.2 Flanges shall be drilled unless otherwise specified and bolt holes shall be 'off centres'. Occasionally, a few bolt holes may require tapping to admit a stiffening rib on the body.

6.3 The dimensions of the valve shall be as given in Table 2.

7 DESIGN AND MANUFACTURE

7.1 Body

The body may be made in two parts, inlet shell and outlet shell. The inlet shell shall have an integral duck foot, for support.

7.2 Diaphragm

Diaphragm shall be fitted between inlet and outlet shells. The parts in the diaphragm should be so designed as to induce minimum head loss in the flow through the valve.

7.3 Water Way Area

The area of the water way through the multi openings in the diaphragm shall not be less than the bore area.

7.4 Inlet and Outlet Shell Connections

The attachment of the inlet to outlet shell of the body shall be adequate to withstand the appropriate test pressure, service conditions and the mechanical loads encountered in the operation. All valves shall have bolted connection. Size of the bolts or studs shall not be less than 22 mm.

7.5 Seats

Seat rings shall be securely fixed, such as, press fitted and riveted so as to preclude their becoming loose in service. Standard countersunk screws shall not be used.

7.6 Door

The door shall be integral with the hinge and shall have a flat seating face.

7.7 Lugs

Minimum two (2) suspension lugs shall be cast integrally on the diaphragm plate corresponding to each door and shall be of adequate strength.

7.8 Number of Doors

<i>Size of Valve, mm</i>	<i>No. of Doors, Min</i>
500, 600 and 800	2
900 to 1 200	3

7.9 By-Pass Connection

By-passes are not standard items on valves, but if required, it is recommended that they shall be made for connection between the inlet and outlet shell of the valve. By-pass valves shall be of same rating as the main valve and conform to IS14846 and the minimum size of the by-pass arrangement shall be indicated below:

<i>Size of Valve, mm</i>	<i>Minimum Size of By-Pass Arrangement, mm</i>
500 and 600	80
700 to 1 200	100

Table 2 Dimensions of Valves
(Clause 6.3 and Fig. 1)

All dimensions in millimetres.

Sl No.	Size	Length Over Flanges <i>A</i>	Overall Height <i>B</i>	Height of Centre From Duck Foot <i>C</i>	Size of Duck Foot <i>D × E</i>
(1)	(2)	(3)	(4)	(5)	(6)
i)	500	815	1 150	600	200 × 250
ii)	600	940	1 335	685	250 × 250
iii)	700	1 000	1 445	750	300 × 375
iv)	750	1 045	1 445	750	300 × 375
v)	800	1 118	1 555	810	300 × 375
vi)	900	1 250	1 660	860	300 × 375
vii)	1 000	1 250	1 730	915	300 × 375
viii)	1 100	1 396	2 070	1 080	400 × 450
ix)	1 200	1 500	2 250	1 175	400 × 450

NOTE — The tolerance on the face-to-face dimensions shall be as follows:

<i>Face-to-Face Dimension</i> mm	<i>Tolerances</i> mm
500 up to and including 800	± 4
Above 800 up to and including 1 000	± 5
Above 1 000	± 6

8 COATING

8.1 All coatings shall be carried out after satisfactory testing of the valves prior to dispatch. All the un-machined ferrous surfaces of the valve (both inside and outside) shall be thoroughly clean, dry and shall be free from rust and grease before painting. All exposed machined ferrous surface shall be painted with one coat of aluminum red oxide primer.

8.2 Two coats of black Japan conforming to Type B of IS 341 or paint conforming to IS 9862 or IS 2932 shall be applied by spray only for exterior application as approved by the purchaser.

NOTES

1 The valves may be assembled without coating, if the purchasing organization specially desires to inspect the assembled valves without any coating.

2 Some specialized coating like epoxy, may call for primer coating immediately after grit blasting of castings. Such valves may be offered for inspection in primer coated condition.

9 TESTING

9.1 Before coating each valve shall be subjected to hydrostatic test given in **9.2** and **9.3**. Test shall be carried out with water. Test pressure and duration of test shall be as specified in Table 3.

Table 3 Test Pressure (Gauge) and Test Duration of Valves

Sl No.	PN Rating of Valve	Test	Test Pressure (Gauge), Min MPa	Test Duration Min min
(1)	(2)	(3)	(4)	(5)
i)	PN 0.6	a) Body test	0.9	5
		b) Seat test	0.6	2
ii)	PN 1.0	a) Body test	1.5	5
		b) Seat test	1.0	2

9.2 Seat Test

The valve shall be placed in the horizontal position and the outlet end shall be filled with water completely. With the inlet end open to atmosphere, there shall preferably be no leakage when the outlet end of the valve is subjected to hydrostatic, non-shock seat test pressure as given in Table 3, for 2 min.

9.3 Body Test

Water shall be filled completely in the body. When the body is subjected to hydrostatic, non-shock body test pressures from the inlet end as given in Table 3, for 5 min, there shall be no leakage or permanent distortion of any component part under the test.

10 INSPECTION

The purchaser or his authorized representative shall have free access to the works of the manufacturer at all reasonable times to inspect the valve at any stage of manufacture and to reject any material which does not conform to the specified requirements.

11 INFORMATION TO BE SUPPLIED WITH ENQUIRY OR ORDER

The following information is to be supplied by the purchaser with enquiry or order:

- Size of valve;
- Maximum working pressure;
- Material of body, diaphragm and doors;
- Whether by-pass arrangement is required;
- Flow velocity or volumetric flow rate;
- Whether water is corrosive and if so, details to be given; and
- Flange details, if other than mentioned in this standard.

12 MARKING

12.1 Following information shall be cast on each valve body in raised letter:

- Manufacturer's name or trade-mark;
- Nominal pressure of valve (PN 0.6 or PN 1.0);
- Size of valve, in mm;
- Direction of flow; and
- Heat Number.

12.2 BIS Certification Marking

Each valve may also be marked with the Standard Mark.

12.2.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which the license for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

13 PACKAGING AND STORAGE

13.1 Valve shall be complete in all respects when shipped.

13.2 Valves shall be drained of residual water and the doors harnessed in the closed position to prevent chattering of body seats and door faces during transit.

13.3 Body ends shall be suitably sealed to exclude foreign matter during transit and storage. Valves shall be stored in roofed store and away from dirt.

ANNEX A

(Clause 2)

LIST OF REFERRED INDIAN STANDARDS

<i>IS No.</i>	<i>Title</i>	<i>IS No.</i>	<i>Title</i>
210 : 2009	Grey iron castings — Specification (<i>fifth revision</i>)	(Part 3) : 2002	Hexagon nuts (size range M 5 to M 64) (<i>fourth revision</i>)
318 : 1981	Specification for leaded tin bronze ingots and castings (<i>second revision</i>)	1538 : 1993	Cast iron pipe fittings for pressure pipes for water, gas and sewage (<i>third revision</i>)
320 : 1980	Specification for high tensile brass rods and sections (other than forging stock) (<i>second revision</i>)	1865 : 1991	Iron castings with spheroidal or nodular graphite (<i>third revision</i>)
341 : 1973	Black Japan types A, B and C (<i>first revision</i>)	2932 : 2003	Enamel, synthetic, exterior (a) undercoating (b) finishing — Specification (<i>third revision</i>)
638 : 1979	Specification for sheet rubber jointing and rubber insertion jointing (<i>second revision</i>)	6603 : 2001	Stainless steel bars and flats — Specification (<i>first revision</i>)
1030 : 1998	Carbon steel castings for general engineering purposes (<i>fifth revision</i>)	9862 : 1981	Ready mixed paint, brushing, bituminous, black lead free, acid alkali, water and chlorine resisting
1363	Hexagon head bolts, screws and nuts of product grade C:	14846 : 2000	Sluice valve for water works purposes (50 to 1 200 mm size) — Specification
(Part 1) : 2002	Hexagon head bolts (size range M 5 to M 64) (<i>fourth revision</i>)		

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Amendments Issued Since Publication

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